

# Feedback and Doc/Query Generation

**Classic Prob. Model**  $O(R=1|Q,D) \propto \frac{P(D|Q,R=1)}{P(D|Q,R=0)}$  ← **Rel. doc model**  
 ← **NonRel. doc model**

**Query likelihood (“Language Model”)**  $O(R=1|Q,D) \propto P(Q|D,R=1)$  ← **“Rel. query” model**

**Parameter Estimation**

$(q_1, d_1, 1)$   
 $(q_1, d_2, 1)$   
 $(q_1, d_3, 1)$  }  $P(D|Q, R=1)$

$(q_1, d_4, 0)$   
 $(q_1, d_5, 0)$  }  $P(D|Q, R=0)$

$(q_3, d_1, 1)$   
 $(q_4, d_1, 1)$   
 $(q_5, d_1, 1)$   
 $(q_6, d_2, 1)$   
 $(q_6, d_3, 0)$  }  $P(Q|D, R=1)$

**Initial retrieval:**

- query as rel doc vs. doc as rel query
- $P(Q|D, R=1)$  is more accurate

**Feedback:**

- $P(D|Q, R=1)$  can be improved for the **current query** and **future doc**
- $P(Q|D, R=1)$  can also be improved, but for **current doc** and **future query**

**Query-based feedback**

**Doc-based feedback**